

CCNA Discovery Curriculum Review

Networking for Home and Small Businesses Chapter 1: Personal Computers and Applications



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ICG: Section 1.1

Key Ideas

- How and where computers are used
- The common features that define all computers
- Applications for local and networked computing

Objectives

- ✦ Identify the purpose and uses of personal computers and describe local and network applications.
- ✦ Compare and contrast different types of computing devices.
- ✦ Explain the binary representation of data.
- ✦ Determine appropriate components and peripheral devices to meet requirements.
- ✦ Install, verify, and upgrade computer components and peripherals.



Personal Computers and Applications

✦ For computers to work effectively, three things have to interact properly:

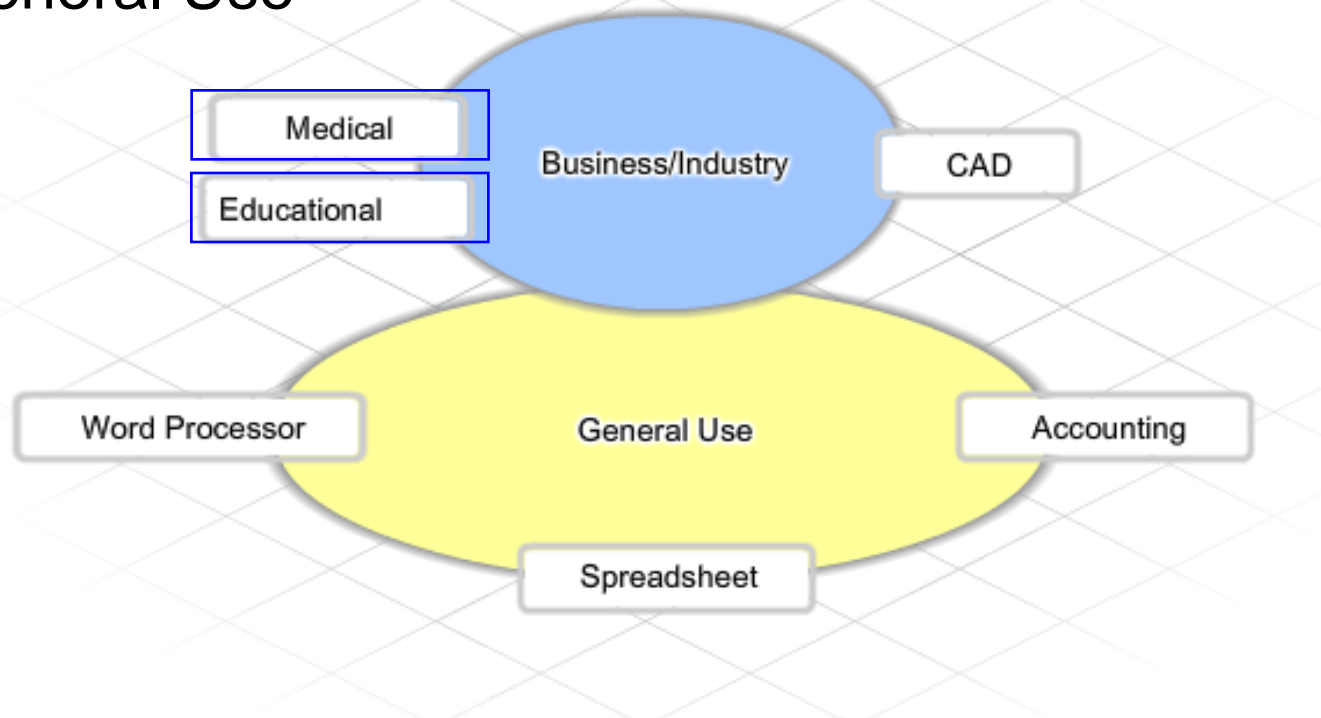
- ✦ Hardware
- ✦ Operating System
- ✦ Software Applications



Personal Computers and Applications 1.1.2

✚ Applications can be divided into two general categories:

- ✚ Business/Industry
- ✚ General Use



Personal Computers and Applications 1.1.2

- ✦ Applications can be classified as **local (on the PC hard drive)** or networked.



ICG: Section 1.2

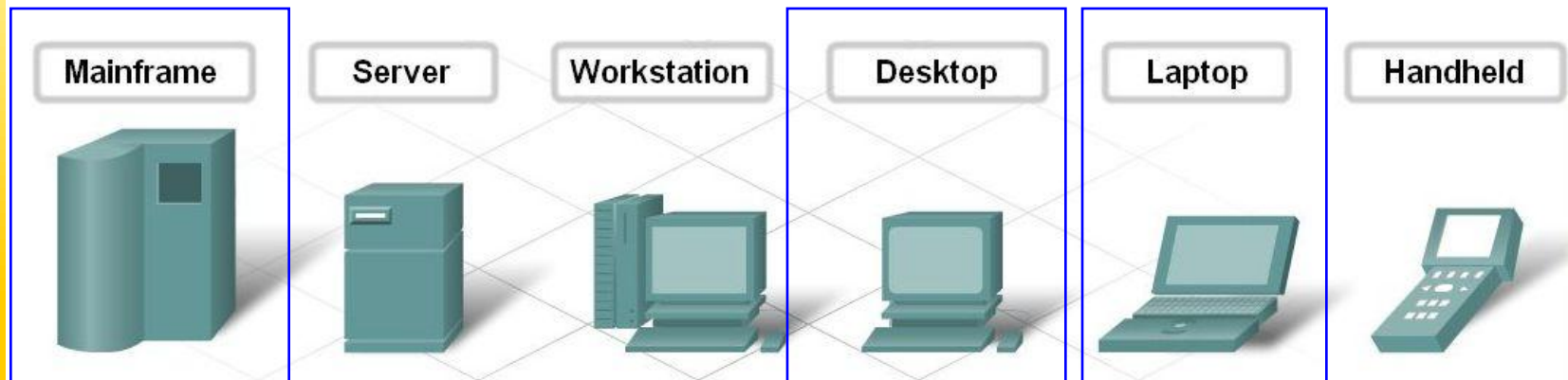
Key Ideas

This section presents an overview of the different types of computers including:

- The Mainframe
- Servers
- Desktop PCs
- Workstations
- Laptops
- Hand-held portable devices

Types of Computers 1.2.1

- ✦ Each type of computer has been designed with a particular purpose in mind





Types of Computing Devices 1.2.2

- ✦ Servers provide services to clients.
 - ✦ Often contain duplicate, or redundant, parts to prevent them from failing and to be accessible at all times.



Blade Server



Rack Mount Server



Standalone server

Types of Computers 1.2.3



Laptop PC

Laptop PC

Laptop computers often provide portable computing power for the mobile workforce. If working in an office environment, the laptop can be connected to a docking station to provide a larger monitor, mouse, full-sized keyboard and network connection.

Types of Computers 1.2.3

✦ PDA

- ✦ Remote/portable access to schedules, etc.



PDA

PDAs (personal digital assistant) are also known as handhelds or Palmtops. These are generic terms that are often applied to any small portable device that provides storage for personal information, such as calendars and contacts. They use primarily touch screen technology although some also have a small keyboard. The distinction between these devices and the Pocket PC is blurred. PDAs are increasingly being combined with cell phones and PC-like functionality. Some PDAs use Microsoft Windows CE and others use a proprietary OS such as Palm OS or Blackberry OS.

ICG: Section 1.3

Key Ideas

This section presents an overview of the use of the binary numbering system in computing including:

- Patterns of bits as the digital format for computing
- The American Standard Code for Information Interchange (ASCII)
- Bytes as a string of eight bits and the smallest unit of measurement in digital storage
- Digital measurements of speed, resolution, and frequency



Binary Representation of Data 1.3.1

✦ Digital (binary) representation of various common forms of data

✦ A bit can have only two possible values:

- one digit (1)
- zero digit (0).



Binary Representation of Data

- ✦ Convert approximately between bits, bytes, Kilobytes, Megabytes, and Gigabytes

Value	Unit of Measure		Unit of Measure	Value
8	Bit	Convert To	BYTE	1
1	KB	Convert To	BYTE	1024
1	MB	Convert To	BYTE	1048576
1	GB	Convert To	BYTE	1073741
1	TB	Convert To	BYTE	1099511

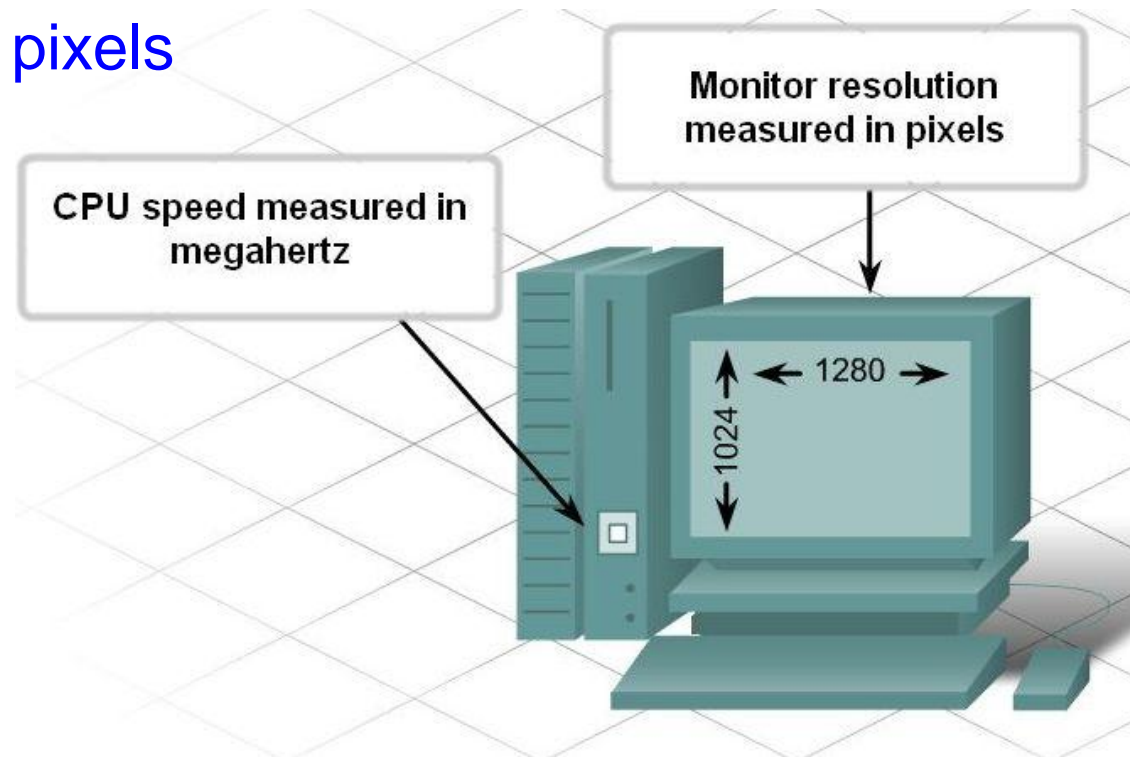
Binary Representation of Data 1.3.3

⊞ Measurements of processing speed and screen resolution

⊞ Speed = hertz

- One hertz represents one cycle per second.

⊞ Resolution = pixels



ICG: Section 1.4

Key Ideas

This section presents an overview of the components of a computer system including:

- The Motherboard
- The Central Processing Unit
- RAM
- Adapter Cards
- Storage Devices
- Peripheral Devices
- Cases and Power Supplies



Computer Components and Peripherals 1.4.1

- ✦ Plan for computer purchase:
 - ✦ Preassembled – low cost, good for general applications
 - ✦ Custom – special applications/needs



Computer Components and Peripherals

✦ Motherboard

Top View



Side View



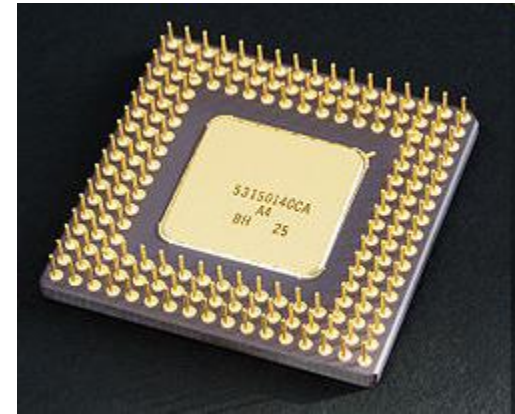
Computer Components and Peripherals 1.4.2

✦ Central Processing Unit (CPU)

- ✦ “Nerve Center”
- ✦ Processes all data in the PC



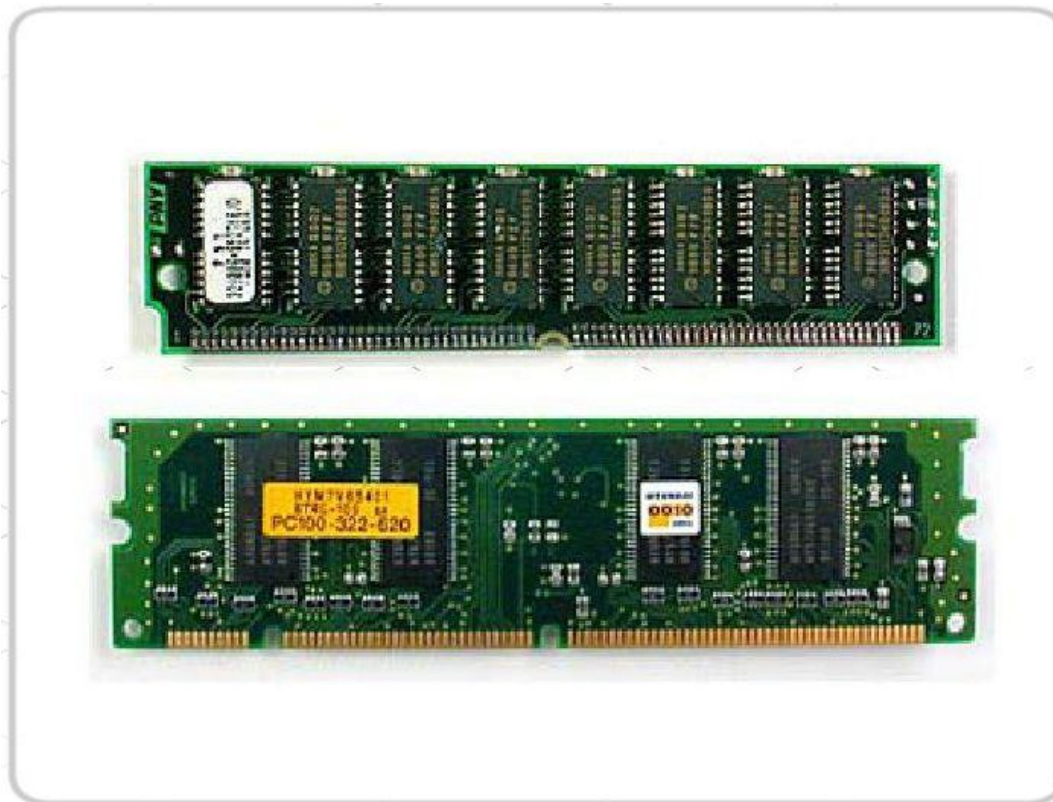
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Computer Components and Peripherals 1.4.2

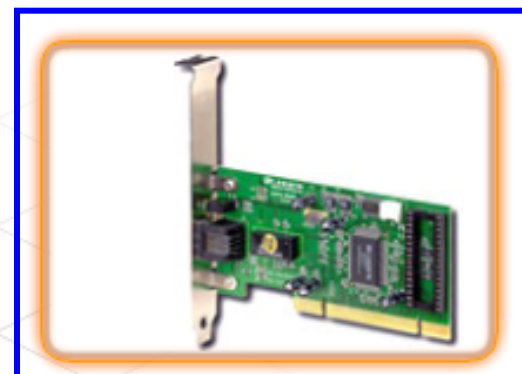
✦ Random Access Memory (RAM)

- ✦ Maximum possible to assure multiple open applications at the same time!



Computer Components and Peripherals 1.4.3

- ✦ Adapter cards add functionality to a computer system

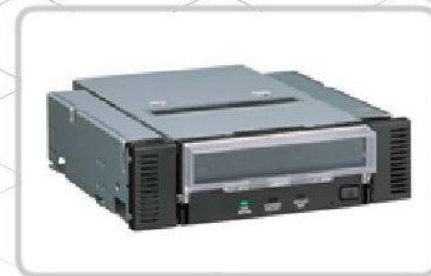
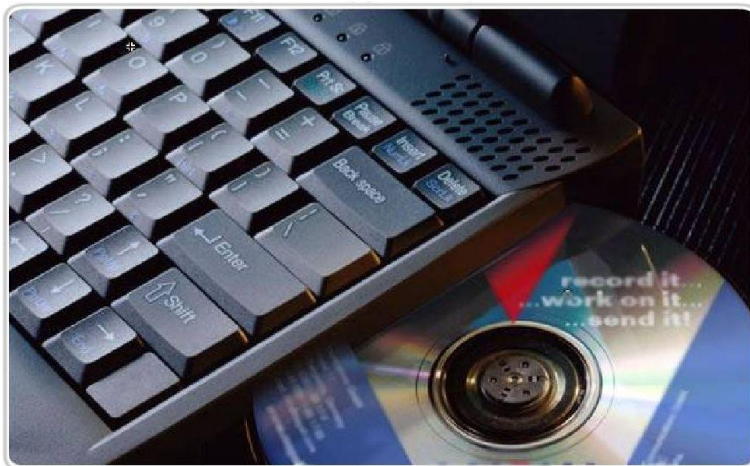


Network Interface Cards

Network interface cards (NICs) enable a computer system to exchange information with other systems in a local network. The speed of the network and the type of technology help determine what NIC is required. The most common networking technology is currently Ethernet.

Computer Components and Peripherals 1.4.4

- ✦ Magnetic storage of data is the most common form found in all computers.
- ✦ Hard drives are the main storage devices





Computer Components and Peripherals 1.4.6

⊠ Surge Protector

- ⊠ Removes voltage spikes and surges from the power line and prevent them from damaging a computer system.
- ⊠ **Small and cheap = Ineffective!**



Computer Components and Peripherals 1.4.6

- ✦ Uninterruptible Power Supplies **UPS** provide:
 - ✦ Backup power to the PC without interruption with an internal battery
 - ✦ Sufficient time for the end-user to properly shut down a computer system



ICG: Section 1.5

Key Ideas

This section presents computer repair best practices including:

- Proper safety procedures
- Computer construction steps
- Testing procedures
- Installation of peripherals

Establish Safety Rules and Enforce Them!

Safety and Best Practices

- Use an antistatic mat and grounding wrist strap.
- Use antistatic bags to store and move computer components. Do not put more than one component in each bag, because stacking them can cause some of the components to break or become loose.
- Do not remove or install components while the computer is on.
- Ground often by touching a piece of bare metal on the chassis or power supply. This will prevent static charges from building up.
- Work on a bare floor because carpets can build up static charges.
- Hold cards by the edges to avoid touching chips or the edge connectors on the expansion cards.
- Do not touch chips or expansion boards with a magnetized screwdriver.
- Turn off the computer before moving it. This is to protect the hard drive, which is always spinning when the computer is turned on.
- Keep installation/maintenance CDs and disks away from magnetic fields, heat, and cold.
- Do not place a circuit board of any kind onto a conductive surface, especially a metal foil. The Lithium and Nickel Cadmium (Ni-Cad) batteries used on boards may short out.
- Do not use a pencil or metal tipped instrument to change DIP switches or to touch components. The graphite in the pencil is conductive and could easily cause damage.
- Do not allow anyone who is not properly grounded to touch or hand off computer components. This is true even when working with a lab partner. When passing components, always touch hands first to neutralize any charges.

Computer System Components 1.5.1

Safety and Best Practices

- Use an antistatic mat and grounding wrist strap.



Computer System Components 1.5.1

- ✦ Power supplies and monitors operate at dangerously high voltages and should only be opened by individuals with special training!



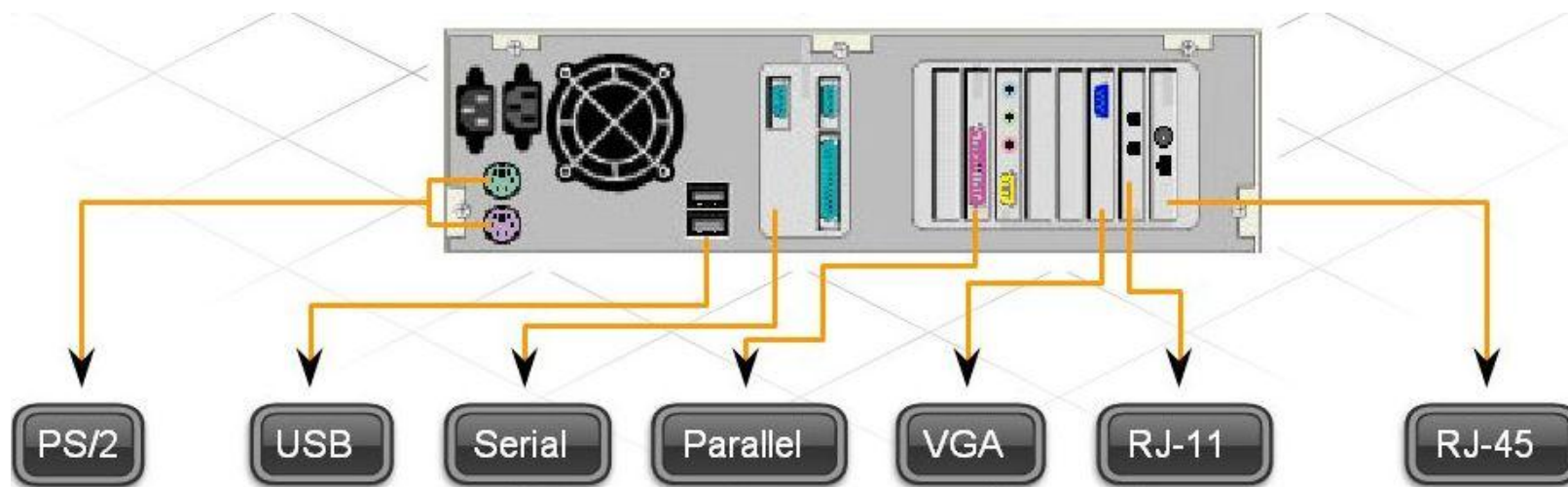
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Computer System Components

PC Ports



Computer System Components 1.5.1

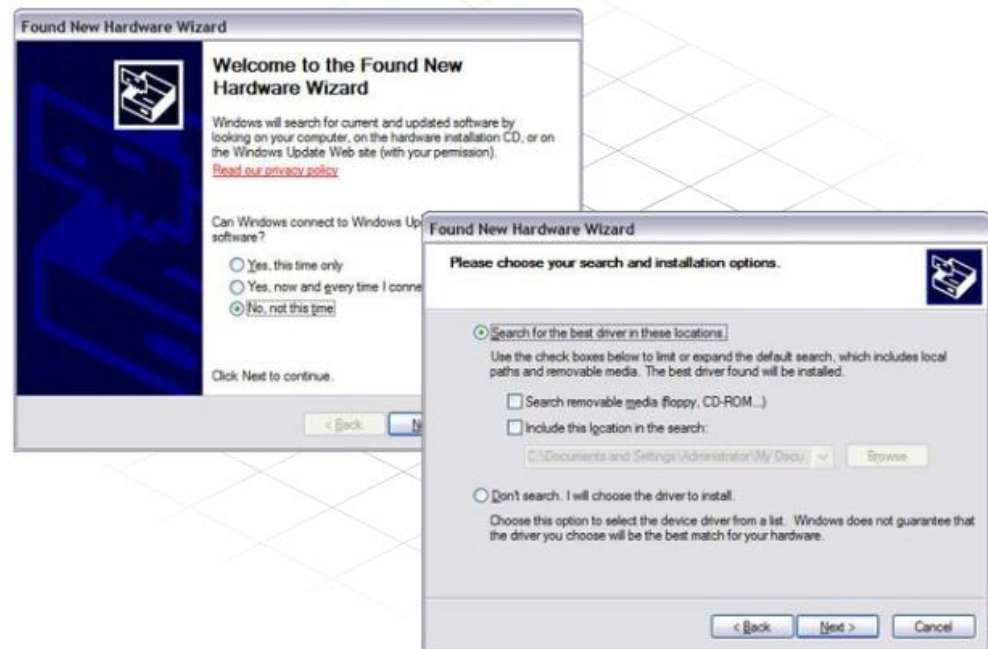
- ✦ Handle RAM and cards by the edge to help prevent ESD damage.



Computer System Components 1.5.2

✦ Device drivers

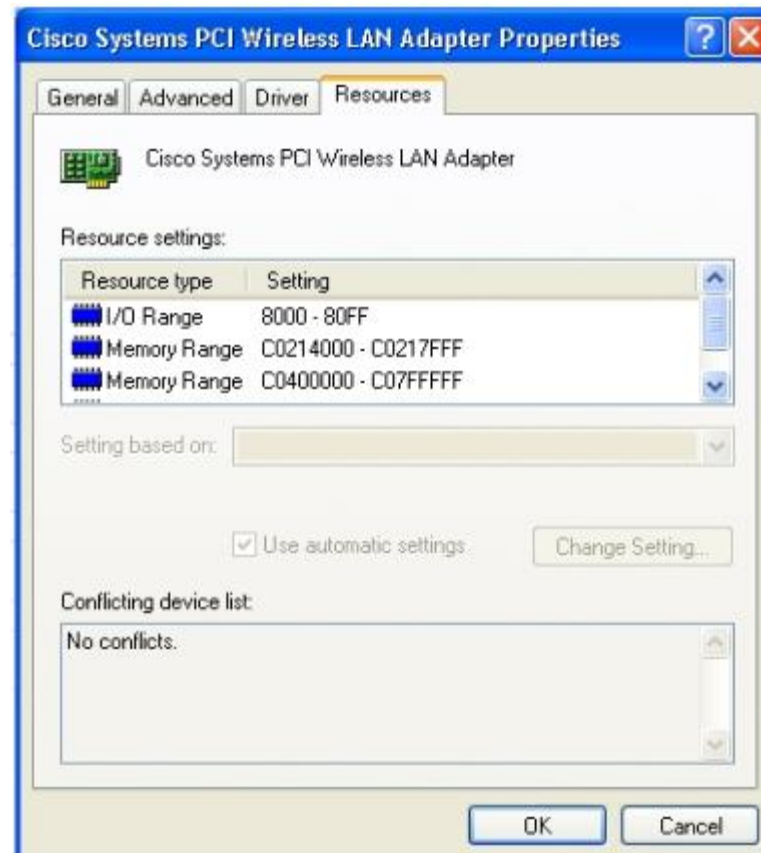
- ✦ Common components are usually contained in the operating system
- ✦ The most current driver can be obtained from the manufacturer's web site and should normally be used.



Computer System Components 1.5.2

✦ System Resources

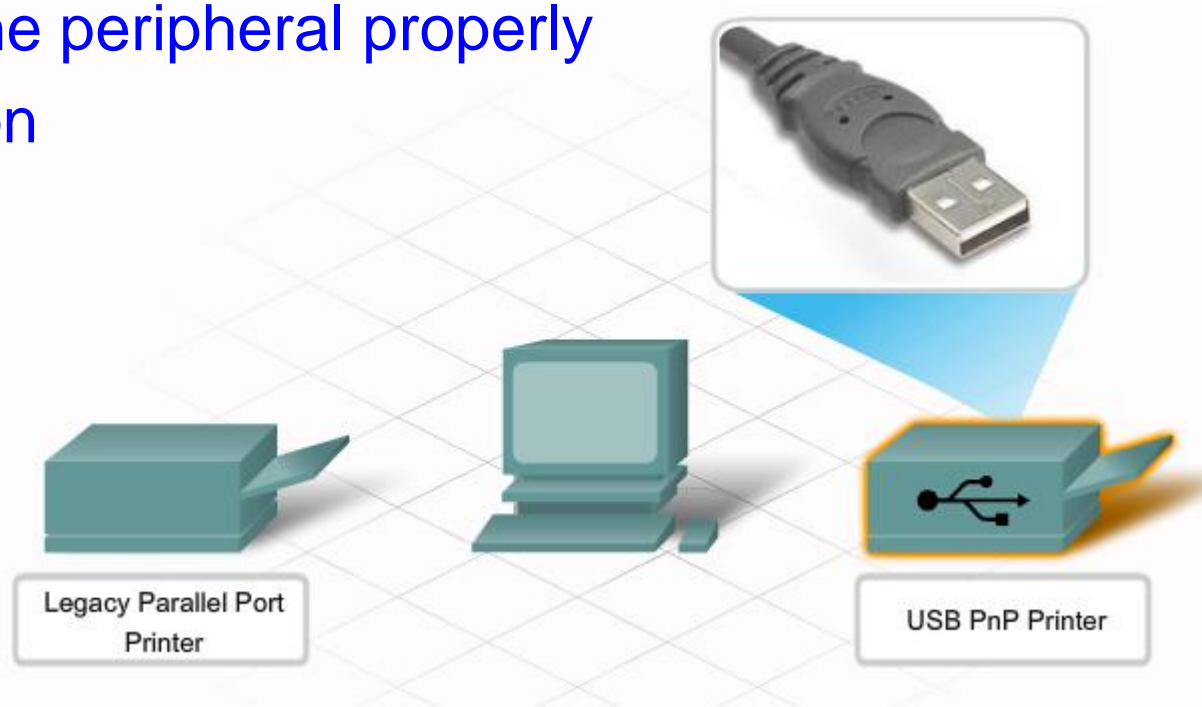
- ✦ Dynamically assigned between the component and operating system



Computer System Components 1.5.3

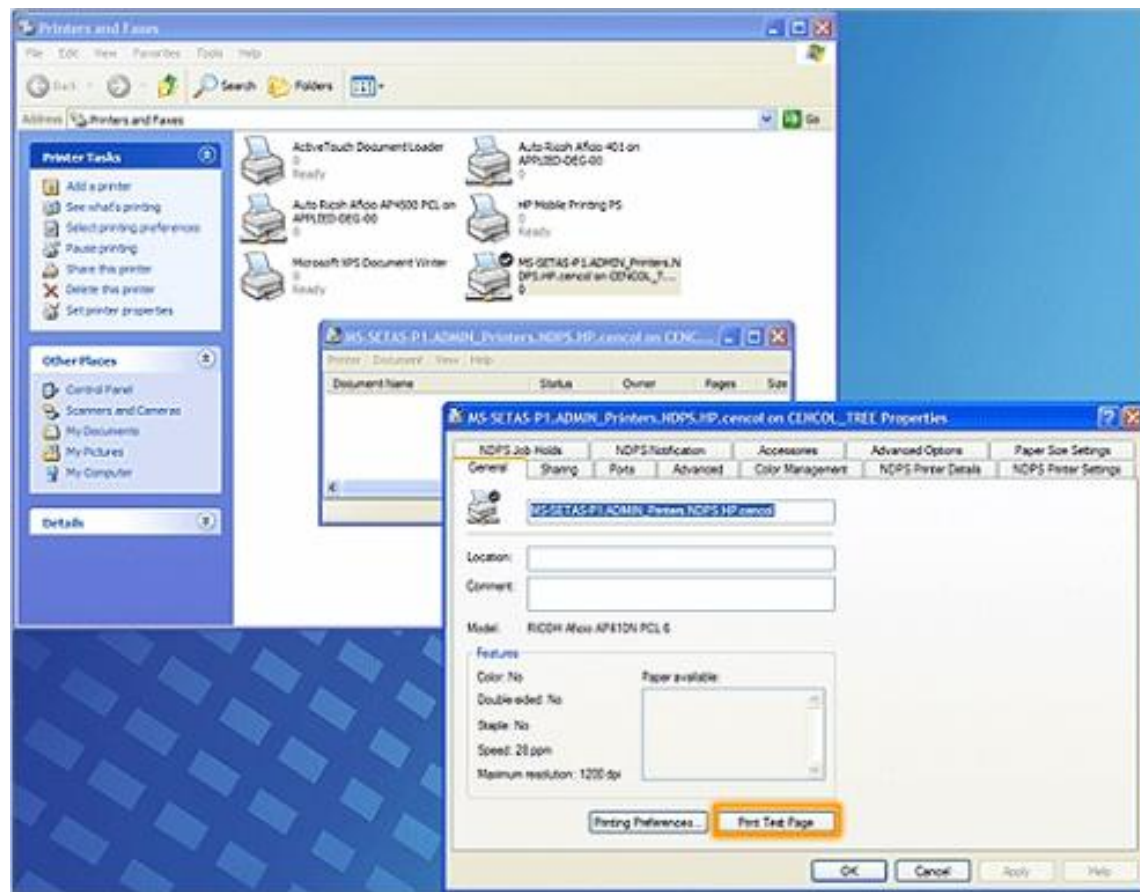
✦ The installation of a peripheral device requires several steps. Order and detail of these steps varies.

- ✦ Download and install the most current driver
- ✦ Cable the peripheral properly
- ✦ Power on



Computer System Components 1.5.3

- Some devices, like printers, have a self test procedure to verify functionality.



Summary

- ❏ Computers are used everywhere, in all types of environments
- ❏ There are many different types of computers available including: Mainframes, Servers, Desktop PCs, Workstations, Laptops and Hand-held portable devices.
- ❏ Data is represented by binary digits (bits), bytes (B), kilobytes (kB), megabytes (MB), gigabytes (GB), and terabytes (TB).
- ❏ Data transfer rates are measured by bits per second.
- ❏ Computer screen resolution is measured in pixels.
- ❏ Analog frequencies, wireless transmissions and processor speeds are measured in Hertz.
- ❏ Things to consider when purchasing a computer: Motherboard, CPU, RAM, Adapter Cards, Storage, Peripherals, UPS, Surge Suppressors
- ❏ Safety procedures must be followed when working inside a computer, both to protect the equipment and prevent harm to the technician.

